Multi population genetic algorithm for allocation and sizing of distributed generation

Abstract:

Distributed generation has been becoming more well-known in the power sector due to its ability in power loss reduction, low investment cost, increase reliability, and most significantly, to exploit renewable-energy resources. The optimal placement and sizing of distributed generation are necessary for maximizing the distributed generation potential benefits in a power system. In this paper, a novel multi population-based genetic algorithm is proposed for optimal location and sizing of distributed generation in a radial distribution system. The objective is to minimize the total real power losses in the system and improve voltage stability within the voltage constrains. Both the optimal size and location are obtained as outputs from the genetic algorithm toolbox. An analysis is carried out on 30 bus systems and compare with the analytical method and standard genetic algorithm to verify the effectiveness of the proposed methodology. Results show that the proposed method is more efficient in power losses reduction compared to analytical method, also faster in convergence than standard genetic algorithm.